

## **DETAILED ACTION**

1. The following is a **Notice of Allowance** in response to Applicant's amendments received on 10/02/2009.

### **Drawing**

2. Applicant's new drawings are herein acknowledged and have been entered into the record.

### **Specification**

3. Applicant's amendments to the specification are herein acknowledged and have been entered into the record.

### **Examiner's Amendment**

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to Applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Turgut Aykin on July 2, 2009.

### **In the Abstract**

This Abstract will replace all prior versions and Abstracts in the instant application.

The present invention relates to a method for workforce scheduling in which workload and workload types vary during scheduling period. The method acquires agent and skill requirements for all periods and contact types; acquires the contact center information including agent skill groups, agent work groups, tour and shift scheduling rules, agent availability, objective criterion to be optimized and its parameters; develops a Mixed Integer Programming (MILP) model for the scheduling environment; applied an optimization algorithm that uses the Branch and Cut algorithm with a Rounding Algorithm to improve performance to be solved; and locates a globally optimal or near optimal workforce schedule with the lowest possible cost or paid time or the maximum agent satisfaction. Detailed schedules may be developed by assigning daily shifts to work patterns, the breaks scheduled to daily shifts, and days off scheduled to weekly tours.

### **In the Claims**

This listing of claims will replace all prior versions and listings of claims in the instant application. The Claims have been amended as follows:

Please cancel claims 9 – 20.

### **Allowable Subject Matter**

5. Claims 1 – 7 are allowed.

### **Reasons for Allowance**

6. The following is an examiner's statement of reasons for allowance:
7. The closest prior art to the claimed invention are Dietrich and Castonguay. Dietrich discloses solving mixed integer programming problems to optimize resource scheduling. Castonguay teaches different staff level types and tour rules. However, neither Dietrich nor Castonguay alone or in combination disclose or teach the method steps (a) – (f) recited in claim 1 where the constraints and objective function are formulated in accordance with the specific MILP model comprising steps c1 to c10 recited in claim 1.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **Conclusion**

8. The following references are considered relevant to the instant application.
- Editors (2003). A Journey Renewed. Call Center magazine. Jan 2003. 16(1): 12-14; discloses the Advanced Workforce Optimization (AWO) Portal from AC2 Solutions.
  - Mabert VA and Watts CA (1982). A Simulation Analysis of Tour-Shift Construction Procedures. May 1982. 28(5): 520-532; discloses a method for work force scheduling .
  - Thompson GM (1995). A Simulated-Annealing Heuristic for Shift Scheduling Using Non-Continuously Available Employees. Computers Ops. Res. 23(3): 275-288; discloses a method for labor scheduling using simulated annealing.
  - Segal M (1974). The Operator-Scheduling Problem: A Network-Flow Approach. Operations Research. July-Aug 1974. 22(4): 808-823; discloses a method for scheduling tours of operators in a call center environment.
  - Narasimhan R (1995). An algorithm for single shift scheduling of hierarchical workforce. European Journal of Operational Research. 96: 113-121; discloses a method of scheduling a workforce using a plurality of rules and an optimizing algorithm.
  - Altman E, Gaujal and Hordijk A (2000). Multimodularity, Convexity, and Optimization Properties. Mathematics of Operations Research. 25(2): 324-347; discloses a method for queuing using multimodular functions.

Art Unit: 3624

- Henderson W and Berry W (1976). Heuristic Methods for Telephone Operator Shift Scheduling: An Experimental Analysis. *Management Science*. 22(12): 1372-1380; discloses a method for scheduling telephone operators given a set of constraints including work type and shift types.
- Koole G and Van Der Sluis E (2002). Optimal shift Scheduling with a Global Service Level Constraint. *IIE Transactions*. 35: 1049-1055; discloses a method of optimally scheduling shifts as specifically applied to a number of global call centers and constraint types.
- Brusco MJ and Johns TR (1996). A Sequential Integer Programming Method for Discontinuous Labor Tour Scheduling. *European Journal of Operational Research*. 95: 537-548; discloses a method of optimally scheduling tours using heuristic and linear programming.
- Dantzig GB (1954). A Comment of Eddie's "Traffic Delays at Toll Booths. *Ibid*. June 21, 1954. 339-341.
- Gaballa A and Pearce W (1979). Telephone Sales Manpower Planning at Qantas. *The Institute of Management Sciences* 1-5.
- Aykin T (1996). Optimal Shift Scheduling with Multiple Break Windows. *Management Science*. 42(4): 591-602.
- Aykin T (1998). A comparative evaluation of modeling approaches to the labor shift scheduling problem. *European journal of Operation Research* 125: 381-397.

Art Unit: 3624

- Aykin T (1998). A composite branch and cut algorithm for optimal shift scheduling with multiple breaks and break windows. Operations Research Society. 49: 603-615.
- Bechtold SE and Jacobs LW (1990). The Institute of Management Sciences. 1339-1351.
- Baily J (1985). Integrated Days Off and Shift Personnel Scheduling. Comput. and Indus. Engng 9(4): 395-404.
- Jarrah AI, Bard FJ and deSilva AH (1994). Solving Large-scale Tour Scheduling Problems. Management Science. 40(9): 1124-1144.

Any inquiry of a general nature or relating to the status of this application or concerning this communication or earlier communications from the Examiner should be directed to **Brett Feeney** whose telephone number is **571.270.5484**. The Examiner can normally be reached on Monday-Thursday, 7:30am-6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, **BRAD BAYAT** can be reached at **571.272.6704**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal/pair> . Should you have questions on access to the

Art Unit: 3624

Private PAIR system, contact the Electronic Business Center (EBC) at **866.217.9197**  
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Any response to this action should be mailed to:

***Commissioner of Patents and Trademarks***  
**Washington, D.C. 20231**

or faxed to **571-273-8300**.

Hand delivered responses should be brought to the **United States Patent and Trademark Office Customer Service Window:**

Randolph Building  
401 Dulany Street  
Alexandria, VA 22314.

/BRETT FEENEY/

Examiner, Art Unit 3624

/Romain Jeanty/  
Primary Examiner, Art Unit 3624  
January 17, 2010